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Using Case Work as a Pretest to Measure Crisis Leadership Preparedness

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Abstract

Today's leaders must thrive in a world of turbulence and constant change. Unstable conditions frequently generate crises, emphasizing the need for crisis leadership preparedness, which is missing from many business curricula. Thus, the purpose of this work was to develop a learning module in crisis leadership preparedness. As a baseline measure or pretest, 217 graduate students were asked to analyze two crisis leadership cases during the first week of an entry leadership class. Content analysis provided the method to identify where student analyses fell short. These gaps in learning then informed the creation of student learning objectives. Applying inquiry-based learning, I then suggest instructional methods that I incorporated into an active learning module to better prepare today's leaders for crisis leadership.

Keywords inquiry-based learning, crisis leadership preparedness, crisis typologies, leadership attribution error

Introduction

Today's leaders must thrive in a world of turbulence and constant change (Samani & Thomas, 2016). Global instabilities, changing geo-environments, financial constraints, technological advances, information proliferation, false news, and globalization lead to uncertainty becoming the norm. Unstable conditions often generate crises. Thus, competent leadership includes the ability to lead during crisis. Although several studies in crisis leadership have appeared in the literature over the past five years (Lalonde & Roux-Dufort, 2013; Shrivastava, Mitroff, & Alpaslan, 2013; Wright, Nichols, McKechnie, & McCarthy, 2013), today's business curricula often exclude crisis leadership preparedness (Cirka & Corrigall, 2010; Snowden & Boone, 2007). As business curricula begin to include the topic, in this article, I demonstrate how to assess students' baseline knowledge of crisis leadership through the use of inquiry-based learning (IBL), more specifically, case-based work; I then use that assessment data to develop an active learning module that better prepares today's leaders for crisis leadership (DeRue & Wellman, 2009; Halpern, 2004). I now follow with a more detailed account of the process I chose and why I chose it.

To begin, I asked students to submit narratives in which they briefly analyzed two leadership crisis cases, specifically, the Mann Gulch fire and Merck Pharmaceuticals (see appendix for case summaries). Then, I use my analysis of their work as a pretest. I explain in detail in the method section why I chose these two particular cases for students to compare and contrast. Informed by my pretest analysis, in-class debriefings and the crisis leadership literature, I applied IBL to formulate student learning objectives (SLOs), which guided my selection of instructional methods and media as I designed a learning module for crisis leadership preparedness. I next follow with a literature review of both crisis leadership and the adult learning practices applied when developing the learning module.

Crisis Leadership

Researchers Vroom and Jago (2007) define leadership as "a process of motivating people to work together collaboratively to accomplish great things" (p. 18). Thus, during crisis, leadership becomes a group dynamic during which leaders and followers coconstruct the reality of the situation and interact to achieve a shared outcome. Demiroz and Kapucu (2012) define crises as unforeseen emergency events, natural or manmade, that lead to unstable or dangerous conditions. Depending on magnitude, crises involve an individual, a group, an organization, a species or an entire society. Crises may occur in minutes, like in the Mann Gulch fire, or take years to unfold, like river blindness in the Merck case. Either way, the public expects competent leadership decision making prior to, during and following a crisis (Demiroz & Kapucu, 2012).

Decision making during crisis, however, challenges decision makers due to time constraints, high situational uncertainty and limited situational control (Burnett, 1998; James & Wooten, 2010; Lu, 2013), especially when people are in harm's way (Varma, 2015). For example, in the Mann Gulch case, 13 out of 15 firefighters died less than 2 hours after being airdropped one-half mile from what initially presented as a routine firefighting event. In the Merck case, the company invested millions of dollars in developing a drug that, even if effective, did not have a revenue stream or established distribution channels. To overcome these types of crises, past research aids in identifying critical competencies required by leaders and followers; I next discuss those competencies.

Crisis Leaders

When considering the leadership process, leaders continue to receive the most attention (Chhokar, Brodbeck, & House, 2007; Hackman & Wageman, 2005). Required crisis leader competencies include clarity of vision and values, decision making, problem solving, adaptability, team development, communication, and constant situational acuity (Demiroz & Kapucu, 2012; Kapucu & Van Wart, 2008; Klann, 2003). Command and control leadership works well for immediate life-threatening crises (crime fighting, firefighting, triage in emergency situations; Grint, 2008). Other types of prolonged crises require distributive leadership due to needing leaders in multiple professions and at multiple locations. For example, it took several decades for researchers to discover the cause of river blindness and another decade for Merck to develop and test a drug to contain it. Then, in order to get the drug to remote areas, Merck worked with allies to coordinate funding sources and create distribution channels.

In addition, skilled crisis leaders recognize the importance of following protocol while paradoxically deviating from it when situations demand it (Demiroz & Kapucu, 2012; Kapucu & Van Wart, 2008). The leaders in both crisis cases in this study deviated from standard protocol, which required calculated risk-taking and creative thinking made possible by past experience (Bolden, Witzel & Linacre, 2016; Fiedler, 2002; Gannon, 2008; McIver, Fitzsimmons, & Flanagan, 2016; Price, 2014; Schroeder-Saulnier, 2014). As these two cases demonstrate, experienced leaders also need experienced followers.

Crisis Followers

The study of crisis followers continues to evolve but pales in comparison with that of leaders. Kelley (1988)describes skilled followers as well-balanced risk takers who achieve success with or without a strong leader. Experienced followers think independently while being committed to the organization, approaching work with energy and assertiveness (Kelley, 1988). Chaleff (2009) identifies essential crisis follower competencies as supporting the leader, having courage to follow the leader without fully understanding the leader's reasoning and performing competently and efficiently. Baker (2007) and Chaleff (2009) identify followers as integral to any successful leadership process and Berg (as cited in Baker, 2007) sees functions of followers and leaders as interchangeable specific to the expertise required. However, crisis situations often jeopardize leaders and followers in achieving a successful outcome.

Crisis Situations

Contingency theories of leadership, such as cognitive resource theory (Fiedler, 1964), path-goal theory (House & Mitchell, 1975), and situational leadership (Hersey & Blanchard, 1969), stress the critical influence a crisis situation has on outcomes. Three decades of research indicate that leadership outcomes depend on the situation (Fiedler, 2002; Vroom & Jago, 2007). Specifically, situations account for nearly three times the variance in outcomes than do differences among individual leaders and followers (Vroom, 2000; Vroom & Jago, 1988, 2007; Vroom & Yetton, 1973).

Fiedler's (2002) extensive work on situational factors identifies a number of important findings regarding interactions of leaders and followers during crisis. First, in a series of studies conducted in the late 1980s and early 1990s, mostly pertaining to military environments, we learn that a leader's intelligence best contributes to group performance when the leader's willingness and ability to instruct the group coincides with the group's willingness and ability to follow instructions (Fiedler, 2002).

However, Fiedler indicates this is difficult to achieve in some crisis situations. Second, the leader's experience will only be valuable to a group when communication between leader and follower occurs (Fiedler, 2002). Third, in stressful situations, experienced leaders perform significantly better than inexperienced leaders as they know what to expect (Fiedler, 2002). Finally, more demanding cognitive functions, such as decision making, creativity, and judgment, diminish during stressful situations (Fiedler, 2002). Thus, in crisis situations, where imminent danger exists, based on one's related past experience, retrieving from memory requires a lesser degree of cognitive function than identifying innovative solutions. Yet innovative solutions may be critical in achieving desired outcomes. As experienced people perform better under stress, they recognize that novel situations demand creativity versus protocol to achieve a sought-after outcome.

We see major evidence of these research findings in the Mann Gulch situation. C47 engine noise prior to drop, loss of radio and map, smoke, and the escalating roar of a fire of this magnitude severely impaired communication. Weick's (1993) insightful analysis of the Mann Gulch fire suggests additional contributing factors impairing communication, which include follower breakdown in sense making and role structuring; these factors may lead to insubordination, extreme individualism, chaos, and catastrophe. Yet in the face of imminent death, Dodge's experience led him to see an innovative solution that his inexperienced crew could not foresee. This disaster and others like it prompt crisis experts to continue exploring new avenues of crisis intervention, including developing crisis typologies to improve crisis planning, prevention and intervention, making them important to include in a crisis-preparedness learning module.

Gundel's Crisis Typology

In general, typologies aid in studying phenomena by categorizing them according to relevant criteria. I considered several factors when choosing a crisis typology (Gundel, 2005). First, I wanted one that fit disaster situations like those described here. Second, for teaching purposes, I wanted one that was informative but not too complex, which is generally true for two-dimensional typologies (Björck, 2016). Third, the typology had to identify strategies that provided a segue into type of leadership needed. Fourth, Gundel (2005) used the Mann Gulch fire as an example in his typology work, which I thought would help students better understand both his typology and the crisis. Finally, the Merck case fits the criteria identified in Gundel's description of fundamental crises, which include containing new diseases such as polio, HIV, and river blindness. For all these reasons, Gundel's typology appeared the best fit.

According to Gundel (2005), his two-dimensional typology identifies four mutually exclusive crisis categories with accompanying strategies. Two varying crisis conditions, predictability and influenceability (easy vs. difficult), form the basis of the quadrants. Table 1 includes characteristics, examples, and strategies by quadrant. The strategies suggest the type of leadership needed. To illustrate, Quadrants 1 and 3 strategies require distributive leadership that coordinates expert efforts in a number of specialty areas to prevent predictable crises through effective planning and prevention measures. Quadrants 2 and 4, on the other hand, require a team of experts on the ground to combat an unexpected crisis in progress, which requires a command and control approach and training in the latest relevant technologies.

Table 1. Gundel's Crises Typology.

Crises quadrant	Predictability	Influenceability	Examples	Strategies
Quadrant 1: Conventional crises (occur frequently)	Easy to predict	Easy to influence	Explosions in chemical plants, electrical power outages	Integrated systems of quality control and crisis management, regulatory controls
Quadrant 2: Unexpected crises (rarely occur)	Difficult to predict	Easy to influence	Titanic, 9/11, and the Mann Gulch Fire	Improve communication through better technology, training for unexpected events occurring during crises
Quadrant 3: Intractable crises (difficult to prepare for)	Easy to predict	Difficult to influence	Earthquakes, global change	Political and regulatory solutions across organizations and borders
Quadrant 4: Fundamental crises (most dangerous, may often occur for prolonged periods)	Difficult to predict	Difficult to influence	Polio, HIV crisis, river blindness	Establishing expert groups to explore countermeasures is likely the best strategy

In summary, crisis leadership preparedness requires an understanding of crisis as well as leadership during crisis. Leaders, followers, and situations all contribute to crisis outcomes. Crisis experts continue to explore crises remedies. Crisis typologies are a more recent remedy aiding in crisis differentiation, planning, and intervention, making them important to include in a crisis learning module. To aid students in effective learning, I next focus on adult learning practices applied when developing the SLOs and the learning module.

Applied Adult Learning Practices

Adult learning practices place the primary responsibility of learning on the learner, while the primary responsibility of the teacher becomes one of identifying key concepts to be learned, ideally stated in the SLOs for the course (Caulfield, 2011). SLOs state measurable goals for students to achieve. Sequencing is important for efficient learning (Bruner, 1966), which has become a major goal in formal education due to limited resources (Overton, 2017). Thus, sequencing SLOs in logical order may aid in sequencing instructional methods. Active instructional methods, those that directly involve students in learning, engage learners more so than passive instructional methods involving only telling (Angelo & Cross, 1993; Hammer & Giordano, 2012; Prince, 2004). Increased student engagement reportedly enhances learning (Carini, Kuh, & Klein, 2006). IBL, a form of active or experiential learning, involves students in a continuous cycle of experience, reflection, conceptualization, and planned experimentation (Kolb, 2015) and has broad-based application to many active instructional methods. Thus, I applied IBL throughout this study.

Inquiry-Based Learning

According to Spronken-Smith (2012), IBL encourages self-directed learning based on an inductive constructivist approach whereby students construct knowledge rather than it being transmitted directly to them. According to Pappas (2014), four approaches of progressive IBL are prominent: (a) confirmation inquiry used to confirm known results; (b) structured inquiry used to explain known results; (c) guided inquiry used to design how to investigate and test a question; and (d) open inquiry used to identify, investigate, test, and report findings on a question. Examples of IBL

include case-based learning, community-based learning and online simulations. My own familiarity with case-based learning led me to recognize that analyzing student case work could be used to gain a better understanding of how they viewed leadership during crisis. I could then apply my analysis to identify misconceptions and gaps in learning, which would help me design a more effective crisis-preparedness module.

Using Case-Based Learning as a Pretest

In case analysis, students apply structured inquiry to real-life situations. In this study, I applied case analysis at the beginning of a course as a pretest to gage students' level of knowledge regarding crisis leadership. As Bruner (1966) concludes,

> It would seem much more sensible to put evaluation into the picture *before* and *during* curriculum construction, as a form of intelligence operation to help the curriculum maker in his choice of material, in his approach, in his manner of setting tasks for the learner. (p. 30)

To my knowledge, using case analysis as a pretest to inform SLOs and choice of instructional methods has not been discussed in the management education literature. This type of assessment not only aids in selecting instructional methods geared toward meeting SLOs, but also aids in framing debriefings after the pretest. Debriefings became a form of guided inquiry where I asked critical questions regarding perceived gaps in learning identified in my analysis. Thus, the student case analyses served as both a pretest and an instructional method grounded in IBL. In the methods section to follow, I provide a detailed explanation of how I used IBL in these ways.

Method

Narrative Sample

Sample data consisted of 217 graduate student analyses of two crisis leadership cases. Students completed the analyses during Week 1 of the entry leadership course in a leadership degree program. Women wrote 64% of the assessments. Students reported the following ethnicities: 72% Caucasian, 13% African American, 6% Asian, 3% Hispanic, 2% American Indian, and 4% undisclosed; 98.1% claimed U.S. citizenship. Students reported their ages as follows: 42% in their 20s, 39% in their 30s, 15% in their 40s, 3% in their 50s, and 1% in their 60s. About 75% identified themselves as part-time students; nearly all of the 75% held full-time jobs.

Case Selection

noted in the introduction, I selected two cases for several reasons. First, although both involved the worst type of crises, ones that resulted in severe injuries or death, the situations suggested vastly different approaches. Because contingency theory strongly supports the idea that leadership depends on the situation (Fiedler, 1964; Hersey & Blanchard, 1969; House & Mitchell, 1975; Vroom & Jago, 2007; Vroom & Yetton, 1973), I wanted to see whether students described differences in the situations and recognized the need for different leadership approaches. Second, past research indicates that people mostly attribute outcomes to leaders (Hackman & Wageman, 2005; Meindl, 1995; Meindl, Ehrlich, & Dukerich, 1985), ignoring not only situations but also followers as well (Baker, 2007; Chaleff, 2009). Relatedly, people mostly attribute outcomes to leaders regardless of condition, which Hackman and Wageman (2005) refer to as leader attribution error (LAE). Thus, I selected one case with a good

outcome and the other with a bad outcome to see whether my pretest analysis supported past research. Third, I wanted students to learn how to categorize different types of crises by applying Gundel's typology. Hence, I selected cases from two different quadrants in preparation for including that exercise in the learning module. In addition to the case summaries located in the appendix, the full cases appear in Useem (1998a, 1998b), *Wagner Dodge Retreats in Mann Gulch* and *Roy Vagelos Attacks River Blindness*.

Assignment Details

Assignments given the initial week of class included three readings, specifically, an introductory chapter on leadership, which discussed leadership as a process; an article on emotional intelligence within teams; and the two crisis leadership cases. Teachers instructed students to complete all readings prior to completing the following written assignment.

> Think about the relatedness of leaders, followers, and situations in each of the two leadership events described in the cases. Compare and contrast the two leadership events by comparing and contrasting each of the three elements of leadership (leaders, followers, situations). What influence did each of these three elements have on the outcome for each case?

Figure 1 illustrates the guiding framework for case analysis. Teachers did not discuss cases in class prior to students completing the work. Teachers collected assessments from 15 classes over a period of nine semesters; six semesters offered two sections. Two experienced teachers taught the classes.

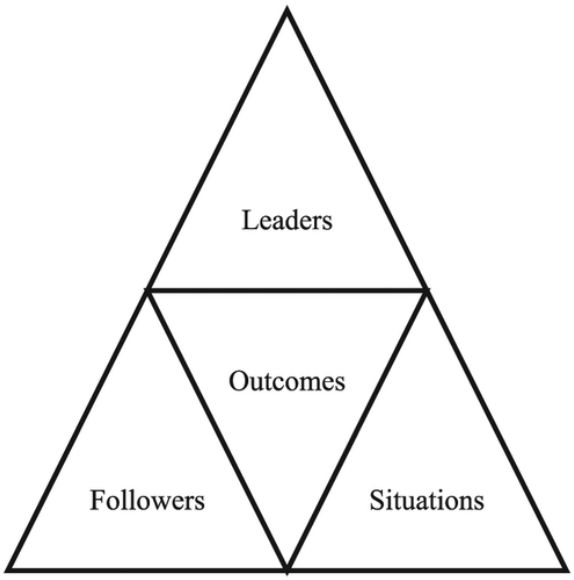

Figure 1. Guiding framework for content analysis.

Conducting the Analysis

I used mixed-method content analysis to analyze the student case analyses. Content analysis focuses on the generation of codes, code clusters, and themes based on interrelated codes derived from word counts and word frequencies (Klenke, 2008). With the help of NVivo software, I identified themes by using a combination of first-level descriptive coding and second-level pattern coding, word counts,

and word frequencies. Pattern coding assisted with the interpretation of latent content and informed the themes I discovered. I analyzed each case separately. When determining what students had identified as important crisis competencies, however, I aggregated the word frequency counts from both cases to determine the competency's full effect. For example, I combined the number of times the term "decision making" appeared in the student analyses of both cases. Applying Figure 1 and the assignment, content analysis identified how student analyses described (a) leaders, (b) followers, (c) situations, (d) relatedness of these three constructs, (e) the primary outcome attribution for each case, and (f) comparison and contrast of the two cases based on the preceding five points.

Priming

On preliminary evaluation of the data, I noted that most participants attributed outcomes solely to leaders. Priming (Cook, 2013), also referred to as instructional scaffolding (Bruner, 1975), has been demonstrated to advance learning more rapidly by introducing preparatory material before exposing students to a more difficult or more commonly misperceived concept. Thus, I wanted to see if priming would reduce LAE, as this had implications for instructional design of the learning module. I selected the Mann Gulch case for priming because of the credible media available, specifically, the Report of Board of Review (1949) and a comprehensive technical report conducted onsite by Rothermal (1993). I did not uncover similar preparatory media for the Merck case; thus, I limited priming to the Mann Gulch case only. Each teacher taught one of the primed classes. The two primed classes were small (n = 13), concluding the data collection. With the exception of priming, assignments were identical for previous classes.

Thus, specific to the Mann Gulch case, I conducted chi-square tests to determine whether credible media influenced outcome attributions of the primed participants when compared with the unprimed participants. As past research indicates (Bruner, 1975; Cook, 2013), I anticipated that priming might aid students in identifying a more balanced outcome attribution, lessening the effect of LAE.

Conducting Word Counts

For each case, I counted the number of words that the case writer associated with leaders, followers, and situations and compared those with the number of words that a random sample of 23 (10.7%) student analyses associated with leaders, followers, and situations. To avoid any influence from priming, prior to random sample selection, I excluded the 13 primed student analyses. I wanted to see if the case word counts for leaders, followers, and situations influenced the word counts of those same three elements in student analyses. To make this determination, I used chi-square tests of association for each element specific to each case as compared with each element of the sample of student analyses for each case.

Second, using NVivo, I completed a word frequency count and from that I identified frequently mentioned leadership competencies for two reasons. First, in looking for gaps in learning, I wanted to see whether competencies identified in the literature were also identified in student analyses. Second, for validation purposes, I wanted to determine whether the themes identified in my content analysis related to the competencies most identified in the word frequency counts.

Results

Preliminary Findings for Both Cases

Descriptions of followers and situations paled in comparison with those of leaders. Follower descriptions mostly focused on the relationships between leaders and followers, often attributing responsibility for the quality of those relationships to the leaders. Markedly, evaluators spent little, if any, time describing the crisis situations for either case. When they compared the situations for the two cases, they noted little difference between them.

Case 1: Mann Gulch

Leader

Indeed, 66% of the student analyses word counts related to the leader. I identified the following positive themes in the assessments of Dodge: experienced, intelligent, technically competent, remained calm during a life-threatening crisis, motivated to save his crew and his own life, and creative when lighting the escape fire. The negative themes identified were his infrequent communication and nonparticipatory decision making, leading to inability to establish trust with his crew and loss of credibility.

Followers

Indeed, 22% of the student analyses word counts focused on followers. I identified the following themes: lack of cohesion as evident by their scattering just prior to most perishing and lack of experience as evident by the fact that they were unaware of the seriousness of the situation until a few minutes prior to most of their deaths. Markedly, only a few analyses mentioned the brief training followers received and their short time on the job. Table 2 contains leader and follower themes and direct quotes in support of the themes.

Table 2. Mann Gulch Assessments: Leader/Follower Themes With Supporting Direct Quotations

Leader themes	
Experienced, intelligent, and competent leader	"As an individual leader, he was strong and competent," "Dodge was intelligent and competent," "a competent smoke jumper having many years of experience," "competent in firefighting."
Calm during crisis, motivated to save himself and others	"Calm and rational when faced with immediate danger," "he was able to remain calm and collected," "staying calm enough to think about a means of survival," "came up with a good plan to save his team."
Creative solution of escape fire during dire crisis	"Able to motivate himself to think quickly," "adapted quickly to find a solution by creating an escape fire," "he was creative enough to devise a plan to save himself and his teammates."
Poor communicator Poor decision maker, sole decision maker	"A 'man of few words.'" [This quote taken from the case was cited by evaluators in 61 assessments.] "Poor communication," "he was a poor communicator."
Lacked trust of crew leading to loss of credibility	"Accumulation of erroneous decisions," "poor decision making," "they no longer trusted his decisions," "Not involving men in decision-making processes affecting all of them," "he did not include their [crew] input in any decision making."

	"Loss of credibility," "credibility had collapsed," "lack of trust from his team members was evident," "[lack of communication] caused men to distrust his leadership and reduce his credibility."
Outcome mainly attributed to leader characteristics	"He communicated poorly, if at all, with his team, and that ultimately led to the deaths of most of them;" Dodge failed to keep 13 men alive;" "the inability for Dodge to express himself to any of his men." Eventually led to their fatalities"
Follower Themes	
Lacked cohesiveness with one another Lack of experience Lacked trust in leader	"Did not operate in an organization that promoted unity and professional development," "lack of trust, cohesiveness." "The relative inexperience of his [Dodge] unit [crew] led to one of the greatest firefighting tragedies of the century," "inexperienced individuals who had not worked together," "team had little experience." "It was hard to trust him [leader]," "there was no trust [in the leader]," "there was no level of trust [in the leader]."

Situation

Indeed, 12% of the student analyses word counts focused on the crisis situation. Students mentioned severe time constraints in 20% of assessments. Eleven evaluators (5.1%) mentioned that loss of radio and map hindered communication and planning. One assessment identified the inability to communicate in a noisy C-47 prior to airdrop. No one identified that shifting winds caused the fire to block the escape route, that the roar of the fire made communication impossible or that smoke may have impaired vision.

Relatedness of Constructs

Relatedness refers to the connection between the three constructs. Narratives identified one prominent theme. Because Dodge did not establish a connection with his crew, he could not achieve a successful outcome by effectively influencing the situation, demonstrated by the following quote, "Dodge's inability to connect with his followers and gain their trust made it nearly impossible to come out of his situation successfully."

Outcome Attribution

Assessments for unprimed participants (n = 204) attributed the outcome to the leader 75% of the time, aligned with past study findings (Hackman & Wageman, 2005; Vroom & Jago, 2007). Notedly, regardless of whether unprimed participants assessed followers as lacking competencies, leader outcome attribution dominated. However, the primed group (n = 13) mainly attributed the outcome to the leader, followers, and situation, attributing the outcome solely to the leader 15% of the time. This finding suggests that priming did influence attributions significantly, $\chi^2(1) = 168.115$, $p < .001$, aligned with findings on scaffolding and priming (Bruner, 1975; Cook, 2013).

Case 2: Merck

Leader

Indeed, 71% of student analyses word counts focused on the leader. I identified the following positive themes in assessments of Vagelos: effective communicator, skilled relationship builder, insightful decision maker, mission-driven, calculated risk taker, placed others' needs first, competent,

intelligent, and ethically/socially responsible. Many evaluators attributed Vagelos' ability to develop relationships with followers as being critical to achieving the good outcome. I identified no negative themes. A few negative statements indicated that prior to informing the public, Vagelos should have first informed the board of his decision to give Ivermectin away free to perpetuity, and that publicly linking his actions to the mission of the company could be viewed as manipulative. After all, board members could hardly argue with Vagelos' mission-based decision of putting people before profits.

Followers

Indeed, 15% of student analyses word counts focused on followers. I identified the following follower themes: followers comprised a cohesive team that had been working together for years and employees highly supported Vagelos and Merck's mission of "people before profits." Table 3 contains leader and follower themes and direct quotes in support of the themes.

Table 3. Merck: Leader/Follower Themes With Supporting Direct Quotations.

Leader themes	
Highly skilled and intelligent leader Participatory Insightful decision maker; calculated risk taker Values driven; ethical and socially responsible	"Competent and enthusiastic," "competent and made decisions easily," "intelligence supported by his competent organizational understanding." "Vagelos listened to his researchers, his bosses, his board of directors." "Considered the consequences of his choice; understanding of a well-established corporate culture," "very clear to see what Vagelos was doing with his decisions," "Vagelos was able to build trust and avoid alienating key players." "Had moral fortitude," "pursued ethical responsibility," "felt a professional responsibility to help those with River Blindness," "saw it as the socially responsible and ethical decision to make [giving away Ivermectin]." "He had no choice in his decision to go ahead with the drug . . . he was able to use the company's values to back-up his decision," "Vagelos chose to do the moral thing."
Outcome was predominantly associated with leader characteristics	"[Vagelos] transformed Merck to a company with a social conscious," "Vagelos saved thousands of lives," "Vagelos was able to work for the aid of millions of people in West Africa while never losing sight of what would ultimately be best for Merck and its shareholders."
Follower themes	
A cohesive team; highly supportive of mission [people before profits] Highly supportive of leader	"All team members upheld it on a regular basis [people before profits], which provided a strong cohesiveness to the group," "researchers were motivated by the conception of themselves working for a greater purpose." "Followers rallied around Vagelos' goal and vision for Merck," "Vagelos gained the trust of the people," "Vagelos had very loyal followers; his followers were extremely supportive."

Situation

Indeed, 14% of student analyses word counts focused on the situation. The *least* number of words in the analyses described the situation while in the case, itself, the *most* number of words described the situation. Two themes emerged. First, about 56% of narratives identified Merck's mission of "people before profits" as the driving force throughout the situation. Second, nearly 20% of narratives identified time as an advantage; the company had several years to develop and bring to market Ivermectin to contain river blindness.

Relatedness of Constructs

In this case, the ability of the leader to connect with his followers led to his successfully influencing the situation, as indicated by the following quote, "The three components [leader, followers, situation] related to Vagelos' influencing the situation positively because the leader–follower link was never broken."

Outcome Attribution

Student analyses (n = 217) attributed the outcome to the leader 71% of the time. Aligned with Hackman and Wageman's (2005) statement that LAE occurs regardless of outcome condition (good or bad), the results of the chi-square test comparing frequency counts of leader attributions for each of the two cases was insignificant, $\chi^2(1) = .456$, $p = .500$.

Competencies Identified by Word Frequency Counts

I used word frequency counts to identify the top 12 leadership competencies. These competencies aligned with identified themes and with competencies identified as important in the crisis leadership literature. Table 4lists the frequency counts. Although the crisis literature identifies accurately assessing the dynamics of a crisis situation as a critical competency, discussion of this competency did not appear in student analyses.

Table 4. Top 12 Leadership Competency Frequency Counts.

Leader competency	Word frequency
Decision making	1,250
Communicating	434
Earning trust	381
Relationship building	373
Leading, managing	368
Successful	265
Effective	219
Experienced	209
Values driven	127
Credible	122
Intelligent	102
Confident	93

Comparisons and Contrasts

Case Word Counts and Student Analyses Word Counts

Recall that I used chi-square tests to determine independence of the word count distributions of cases from those of student analyses to determine whether the case word counts influenced the student analyses word counts for leaders, followers, and situations. SPSS reported the following results for Mann Gulch: For the leader, $\chi^2(1) = 471.170$, $p < .001$, $V = .27$; for the followers, $\chi^2(1) = 137.885$, $p < .001$, $V = .15$; and for the situation, $\chi^2(1) = 648.016$, $p < .001$, $V = .34$. SPSS reported the following results for Merck: For the leader, $\chi^2(1) = 1288.898$, $p < .001$, $V = .38$; for the followers, $\chi^2(1) = 84.761$, $p < .001$, $V = .10$; and for the situation, $\chi^2(1) = 1618.981$, $p < .001$, $V = .42$. Thus, in both cases, chi-square results show independence of word count distributions of cases from those of student assessments, indicating that the number of words that the case writer used to describe leaders, followers, and situations did not influence the number of words that students used to describe the same.

Constructs

Based on the use of comparison and contrast between cases, similarities and differences emerged in the narratives. These are summarized and appear with their respective indicators in Table 5. Table 5 focuses on themes and word frequency counts that emerged rather than occasional mentions of a similarity or difference in the constructs.

Table 5. Similarities, Differences Between Constructs Identified in Narratives and Associated Indicators.

Construct	Similarities	Differences	Indicators
Leaders (primary focus of narratives)	Decisive, experienced, motivated, creative, intelligent, confident	Communication, earning trust, relationship building, leading/managing, effective decision making	Themes, frequency of competencies, narrative word counts
Followers (secondary focus of narratives)	Motivated, secondary focus of narratives	Experience, training, length of team existence, team cohesiveness, support of leader, trust in leader	Themes, narrative word counts
Situations (third focus of narratives)	None noted	Mission driven, time constraints	Themes, narrative word counts
Outcome attributions	Mostly attributed solely to the leader	Primed group (Mann Gulch) attributed to leader, followers, and situation	Frequency counts
Relatedness	Ability of leaders to connect with followers determines the success of the outcome	Level of connection of leaders to followers	Themes

Designing the Learning Module

Drafting SLOs and a Competency Report Card

Drawing from the literature review and my content analysis, I identified the following six SLOs.

SLO 1: Understand the Importance of Synergy Between Leaders, Followers, Situations, and Outcomes

Rationale: Pretest results indicated heavy focus on leaders with little recognition of how the relatedness of leaders, followers, and situations influence outcomes.

SLO 2: Evaluate Leader and Follower Behaviors in the Context of a Specific Crisis Situation

Rationale: Pretests indicated little focus on how differences in the situations necessitated differences in behaviors for both leaders and followers.

SLO 3: Apply Crisis Typologies to Categorize Crisis Events

Rationale: Effective crisis leadership depends on recognizing what type of crisis is occurring; such recognition was absent in the narratives.

SLO 4: Detect a Pattern of Events That Implies a Foreseeable Need for Crisis Leadership Prevention and Intervention

Rationale: According to the crisis literature, by detecting patterns of events that lead to crises, proactive strategies may be identified and implemented.

SLO 5: Differentiate Competencies Critical for All Crises From Those Critical to Specific Crisis Categories

Rationale: Aids in planning crisis competency development specific to crises in general and to those crises likely to occur within a specific organization/industry/profession.

SLO 6: Generate a Crisis-Preparedness Plan for a Foreseeable Crisis

Rationale: Requires students to synthesize what they have learned about crisis preparedness and may serve as a posttest.

Then, using SLOs as the foundation, I selected IBL activities to aid students in achieving SLOs. Figure 2identifies the steps involved. The first level of squares identifies the process steps and the second level of rectangles identifies the origins of discovery for each step.

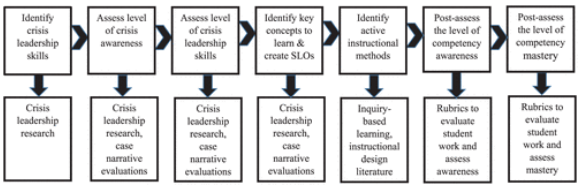

Figure 2. Crisis leadership competency process steps and sources of discovery.

Note. SLOs = student learning objectives.

Finally, Table 6 illustrates what I term a competency report card, providing one example of an inquiry-based assignment for each SLO. Differences in pretest and posttest scores aided in assessing

achievement of SLOs at the conclusion of the learning experience. For example, the following quote from a student case analysis provides evidence in support of SLOs 1, 2, and 3.

Table 6. Crisis Leadership Competency Report Card.

SLO	SLO pretest score, *n* = 204	SLO posttest score, *n* = 29	Example of instructional method	Type of inquiry-based learning applied in instructional method
1. Understand the importance of synergy between leaders, followers, situations, and outcomes.	1	3	Small group: Construct and engage in a 4-to 6-minute role play demonstrating how synergy influences outcomes.	Confirmation inquiry
2. Evaluate the effectiveness of leader and follower behaviors specific to a crisis situation.	2	4	Describe a crisis leadership event that occurred within your organization and based on the desired outcome, evaluate the effectiveness of leader and follower behaviors.	Guided inquiry
3. Apply crisis typologies to categorize crisis events.	0	2	Returning to the two crises you evaluated, apply Gundel's crisis typology to categorize each crisis, explaining your rationale.	Structured inquiry
4. Detect a pattern of events that implies a foreseeable need for crisis leadership prevention and intervention.	1	3	Detect an impending crisis within your life or within your organization and generate three preventative strategies.	Guided inquiry
5. Differentiate competencies critical for all crises from those critical to specific crises categories.	1	3	Within your virtual small group discussion, identify three universal crisis competencies, providing evidence for your selections.	Guided inquiry
6. Generate a crisis-preparedness plan for a foreseeable crisis.	0	3	Generate a crisis-preparedness plan for a foreseeable organizational crisis within your organization.	Open inquiry

Throughout the movie *Apollo 13*, Kranz and his team utilized crisis typology by identifying and classifying the situation, addressing the scope of the crisis and managing the situation. By working as a

team and breaking down the crisis into manageable steps and scenarios, they were able to successfully bring the *Apollo 13* crew back to Earth safely.

Discussion and Conclusion

Implications for Learning

As crisis generally leads to rapid and radical change, I incorporated the crisis module into a graduate class in change leadership that I had designed. In teaching the class twice, I have learned several things. First, telling students to view leadership as a process in itself simply does not work. However, as they engage in forms of active learning such as IBL, they begin to see the difference between leadership as a dynamic process and leadership as an enduring role. That realization is a progression that becomes evident in their work. But whether that progression might flourish over time in a culture that continues to focus on "leader as hero" is an area needing further study.

Second, students struggle with how trust might be established in crisis situations in which people have not worked together previously. I learned that practicing priming by incorporating the concept of "swift trust" (Curnin, Owen, Paton, Trist, & Parsons, 2015), which explains how and why people who meet during crisis trust one another, helped students understand that with sufficient role clarity, trust may develop independent of time. People with military experience generally understand this concept and may add insights during debriefings.

Third, a major aha moment I had during debriefing when teaching the crisis leadership module is that students did not readily grasp the influenceability concept when applying Gundel's typology. We needed to spend time discussing that the degree of influenceability depended on whether the knowledge and technology to contain the crisis already existed. For example, in the Mann Gulch situation, that knowledge and technology did exist (radio, map, and use of escape fire), making this type of crisis influenceable under different circumstances. In the Merck case, however, the knowledge to contain river blindness took decades to develop, making the crisis difficult to influence. Finally, having said this, although typologies are valuable for crisis classification, I see potential for user bias when applying them, providing another opportunity for further research.

Limitations

Several study limitations exist. First, cases written for educational purposes often contain bias, which then influences student assessments. Second, assessing a crisis in its aftermath differs from the actual experience, limiting learning to a certain degree. Third, the absence of specific participant validation increases the potential for my making incorrect or biased interpretations of the data. Nonetheless, the findings from the data analysis closely align with those of previous studies in crisis leadership.

In conclusion, the topic of crisis leadership is missing from most business curricula. Yet today's leaders frequently work in unstable environments and could benefit from crisis leadership preparedness. Applying IBL in a unique way, I used student case analyses of two crisis events as a pretest to help identify gaps in learning. Based on the crisis leadership literature, my analysis of the pretest data and in-class debriefings, I then suggest instructional methods that I incorporated into an active learning module to better prepare today's leaders for crisis leadership. From my experience of

incorporating the crisis learning module into a change leadership course that I taught, I share lessons learned and implications for enhanced learning.

Appendix

Case 1: Mann Gulch

Located in Montana's Helena National Forest, the Mann Gulch fire took place in 1949. A lightning strike started the fire and high winds caused it to expand rapidly, blocking access to the Missouri River, the planned escape route. Less than 2 hours from the drop, the fire fatally overcame all but 3 of 15 crew members. Since the birth of the U.S. Forest Service in 1905, this fire disaster surpassed all others.

A C-47 dropped the crew one-half mile from the fire. The radio broke on drop and a crewman misplaced the area map. Most crew members, including the foreman, had not met each other until that day and none had worked together previously. At the time, the U.S. Forest Service made crew assignments based on hours of rest between assignments rather than established comradery among the crew. The crew foreman, Wagner Dodge, had 9 years' experience fighting fires, while the remaining crew had less than 3 months experience, having completed a 3-week training program earlier that summer.

After telling the crew to shed their gear, Dodge lit an escape fire that burned a circle of grass ahead of the main fire; he motioned to the crew to join him in the burnt-out circle. The U.S. Forest Service did not include escape fires as part of its training program, and crews had not used the strategy previously. Until the point where Dodge started the escape fire, the crew had followed his lead. Appearing confused, they would not join him in the burnt-out circle, trying instead to outrun the fire. Most died less than 20 feet from the circle within a minute after the fire passed over. Dodge, who had laid down in the circle, escaped injury. Two others stumbled onto a wide rockslide path while the fire passed over them. The fireboard later determined that had the perished crew followed Dodge's direction, they would have survived.

Case 2: Merck

Although discovered in 1893, the etiology of river blindness escaped discovery until 1926. Humped back black flies that bred near fast moving river water transmitted the disease. Flies bit individuals already infected and then bit uninfected, transmitting the parasite. Over several years, the parasite caused visual impairment and eventually permanent blindness. By the 1970s, the World Health Organization estimated that the parasite had infected over 18 million individuals living in West Africa and parts of Latin America and placed at risk another 85 million; 1 million already suffered from visual impairment.

In 1975, William C. Campbell, a researcher employed by Merck at the time, developed a drug to combat parasites in livestock. He discovered a close relationship between the parasite in livestock and the one causing river blindness. Thus, he believed he could develop a drug that would prevent river blindness. He requested permission to work on the drug, but because the majority at risk would not be able to pay for it, the request went to Merck's CEO, Roy Vagelos, a physician-researcher who had become CEO not particularly by choice, but rather by popular demand within Merck's ranks. Merck incurred an estimated cost of $200 million to bring the drug to market; development and testing took

about 12 years. Merck's mission places people before profits; thus, without first seeking board approval, Vagelos gave permission to develop the drug and distribute it free of charge to perpetuity to those who needed it but could not afford it. The Federal Drug Administration approved the drug, named Ivermectin, in 1981. It has done much toward eradicating river blindness. The actions Merck took with regard to developing and distributing Ivermectin provides compelling support for corporate social responsibility. Merck benefited financially in the long run as a result of its actions, gaining investors and new business.

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